

Towards a General Theory of Planet Formation: Classifying GQ Lupi b and Predicting COROT's Planets

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I present a new approach to planet formation theory that is centered around a classification of the equilibria of self-gravitating gas spheres. A physical description based on the radiation fluid dynamics with convection is developed and calibrated to the Sun. The equations are then applied to all plausible 'nebula' or 'cloud' conditions in an effort to derive all possible resulting celestial bodies. Thus a general framework for star, brown dwarf and planet formation is set up and used to derive properties of the resulting populations. Two applications are shown for illustration: (1) The origin and nature of the GQ Lupi system, (2) A prediction of the properties of COROT's planetary population. The new IAU definition of a planet will be set in perspective to the planet classification that result from the new approach.